REMARKS

Applicants and Applicants' representative gratefully acknowledge the telephone interview conducted with Examiner Chang on April 29, 2004. Applicants appreciate the Examiner' input and suggestions.

Reconsideration of the present application in view of the following amendments and/or remarks and the attached Supplemental Declaration of Dr. Natarajan S. Ramesh under 37 C.F.R. §1.132 is respectfully requested. In the office action mailed April 1, 2004, claims 1-7, 9, 10, 13-16, 18, 19, 22, 23, and 29-31 were rejected.

Status of the Claims

Claims 1-7, 9, 10, 13-16, 18, 19, 22, 23, and 29-31 are currently pending in the application. Claims 24-27 were previously withdrawn subject to a requirement for restriction. (See paper no. 6) Withdrawn claim 24 has been amended, and withdrawn claims 25-27 have been canceled. No new matter has been added.

Amendments to the Claims

Withdrawn claim 24 has been amended to incorporate all of the limitations of claim 1, in anticipation of potential rejoinder pursuant to MPEP §821.04. Support for the amendments to claim 24 may be found throughout the specification as originally filed. Withdrawn claims 25-27 have been canceled in light of the amendments to claim 24. No new matter has been added.

Interview Summary

In a telephonic interview on April 29, 2004, Examiner Chang and Applicants' representative discussed the rejection of claims 13-14 and 29-31 under 35 U.S.C. §112, first paragraph and the rejection of claims 1-7, 9, 10, 15-16, 18, 19, 22, and 23 under 35 U.S.C. §103(a) with respect to Akao (US 4,469,741) and Foster (US 5,968,630). No final agreement was reached in connection with the claims discussed. With respect to the rejections under §112, Examiner Chang suggested entry of an additional declaration from Dr. Ramesh, including specific experimental data such as process temperatures and line speed of the heat

lamination process and demonstrating successful heat lamination of the film and the foam without significant wrinkling. Examiner Chang stated that such a declaration would be adequate to overcome both the §112 and §103 rejections made in the office action dated April 1, 2004. A supplemental declaration from Dr. Ramesh including the requested information is therefore included with this response.

Rejections Under 35 U.S.C. §112, First Paragraph

Claims 13-14 and 29-31 have been rejected under 35 U.S.C. §112, first paragraph, as allegedly "containing subject matter which was not described in the specification in such a way as to enable one skilled in the art ... to make and/or use the invention" because "the specification lacks a teaching as to how to prevent the known wrinkle problem typically associated with the heat shrinkage of an oriented film by heat lamination." (Office Action at pages 2-3) Applicants respectfully disagree, and previously submitted a declaration from one of the inventors, Dr. Natarajan S. Ramesh, demonstrating that it is possible to form the compositions of the present invention by heat-lamination according to the processes described in the specification without wrinkling of the films used.

The Examiner stated in the outstanding office action that "Mr. Ramesh has not presented any experimental data showing the heat-heat lamination conditions, such as temperature and line speed, etc. As such, the Declaration is deficient as being lack [sic] of any evidentiary support, and appears as mere argument." (Office action at page 3.) Accordingly, Dr. Ramesh has prepared a supplementary declaration under 37 C.F.R. §1.132, which is submitted with this response. In particular, Dr. Ramesh's declaration and the experimental results and photographs attached thereto demonstrate that blown and stretch oriented polyolefin films may be easily heat laminated to a polyolefin foam sheet at various temperatures below the 1st heat peak melting point of the film (as determined by differential scanning calorimetry) without undesirable wrinkling. These suitable lamination temperatures and process conditions may be determined without undue experimentation. Applicants' respectfully submit that this supplementary declaration meets the examiner's request for additional experimental information, and is therefore sufficient to overcome the rejection under §112.

Rejections Under 35 U.S.C. §103(a)

Applicants respectfully submit that Dr. Ramesh's attached declaration is also sufficient to overcome the examiner's rejection under §103(a) with respect to Akao in view of Foster, as suggested by the examiner in the April 29th interview. In particular, Dr. Ramesh's declaration and the supporting data and photographs demonstrate that blown and stretch oriented films are capable of being heat laminated with satisfactory results. This is contrary to Akao, which teaches that "the method of heat-sealing the films 1 and 2 is also not desirable in that heat shrinkage of the film is caused at areas where heating is applied, resulting in the formation of wrinkles which is not desirable from a viewpoint of quality." (Akao at column 1, line 66 through column 2, line 1)

The statements of Akao support a conclusion that the present invention is not obvious, because there must be some suggestion or motivation to modify the reference or to combine reference teachings. (MPEP §2143) Akao clearly discourages the use of heat lamination, which is recited in claim 1 of the current application. Applicants' having proceeded in a direction that the art suggests should be avoided is affirmative evidence of non-obviousness.

Withdrawn Claims

Applicants note that claim 24, directed to a method of making the composite structure described in claim 1, remains withdrawn in the present application. Provided that the currently pending claims are found patentable in view of this response and Dr. Ramesh's supplemental declaration, Applicants respectfully request rejoinder of claim 24, as previously suggested by the examiner in paragraph 6 of paper number 6[1]. To this end, claim 24 has been amended to include all of the limitations of claim 1, thereby placing it in condition for rejoinder and subsequent allowance.

Conclusion

[1] "It is noted that should the claims of Group I be found allowable, the claims of Group II will be subject to rejoinder pursuant to the procedures set forth in the Official Gazette notice dated March 26, 1996 (1184 O.G. 86), wherein claims directed to the process of making or using a patentable product, previously withdrawn from consideration as a result of a restriction requirement, are subject to being rejoined and fully examined for patentability under 37 C.F.R. §1.104"

In light of the foregoing amendments and remarks, and Dr. Ramesh's attached supplemental declaration, Applicants respectfully request withdrawal of all remaining rejections and allowance of the pending claims. Applicants invite the examiner to contact the undersigned at (215) 557-5966 to clarify any issues not resolved by this response.

Date: August 2, 2004

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DOCKET NO.: CSAC-0009
Application No.: 09/782,337

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:
Ramesh and Smith

Confirmation No.: 9820

Application No.: 09/782,337

Group Art Unit: 1771

Filing Date: February 13, 2001

Examiner: Chang, V.

For: Polyolefin Film/Foam/Film Composite Materials and Methods for Producing Same

Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

Supplemental Declaration of Dr. Natarajan S. Ramesh Under 37 C.F.R. § 1.132

I, Dr. Natarajan S. Ramesh, hereby declare the following:

1. I am the Director of Research and Development for Polyolefin Foam Products, North America, at Sealed Air Corporation. I have a PhD as well as a Masters degree in chemical engineering from Clarkson University in Potsdam, New York, and a Bachelor of Science degree in chemical engineering from the University of Madras, India. I have worked in the area of polyolefin foams and composite materials for more than 10 years. In 2002, I was elected Fellow of the Society of Plastics Engineers.

2. I am a co-inventor of the above-captioned patent application ("the subject application").

3. It is my understanding that claims 13, 14, and 29-31 of the subject application are generally directed to composite flooring materials wherein blown and stretch oriented polyolefin films are heat-laminated to a polyolefin foam sheet.

4. I have reviewed the Office Action dated April 1, 2004. As I understand it, the Examiner has suggested that claims 13, 14, and 29-31 of the application fail to comply with the enablement requirement of 35 U.S.C. §112, 1st paragraph, because "the Specification lacks a teaching as to how to prevent the known wrinkle problem typically associated with the heat shrinkage of an oriented film by heat lamination."

5. I previously submitted a declaration with respect to this application on December 8, 2003. It is my understanding that the Examiner objects to that declaration because it "has not presented any experimental data showing the heat lamination conditions, such as temperature and line speed, etc." and is "deficient as being lack[ing] of any evidentiary support, and appears as mere argument."

6. This declaration is provided to submit and explain additional experimental data in support of the patentability of the claimed invention.

7. A preferred process for heat lamination is described in the subject application at page 11, lines 11 to 30. In this process, as described in the specification, heat lamination occurs at a temperature and speed sufficient to cause bonding of the polyolefin film to the polyolefin foam, but the temperature of the process and time of heat exposure are insufficient to cause melting of the film or complete or partial collapse of the cells of the foam sheet.

8. At my direction and according to my experimental plan, experiments were performed according to the methods for heat lamination of polyolefin films to polyolefin foams described in the application. The experimental procedures and results of these experiments are attached hereto as Exhibit A.

9. As shown by the attached data and photographic evidence, there is a range of temperatures, which is unique for each type and thickness of film, at which a polyolefin film can be laminated to a polyolefin foam with satisfactory or excellent results. This temperature range can easily be found without undue experimentation.

10. In particular, the results show the following:

(a) a 2-mil thick HDPE blown film with a 1st heat peak melting point of 258.82 °F laminates satisfactorily at temperatures of about 244 to about 259 °F;

(b) a 0.65-mil thick biaxially oriented polypropylene film with a 1st heat peak melting point of 323.71 °F and a typical upper limit orientation temperature of about 293 °F (145 °C, as described in U.S. Patent No. 3,331,679 (Table II) for a similar polymeric film) laminates satisfactorily at temperatures around or near 282 °F; and

(c) a 0.9-mil thick oriented HDPE blown film with a 1st heat peak melting point of 265.69 °F and a typical upper limit orientation temperature of about 266 °F (130 °C, as described in U.S. Patent No. 3,331,679 (Table II) for a similar polymeric film) laminates satisfactorily at temperatures of about 224 to about 238 °F.

11. I further declare that all statements made herein of my knowledge are true and that all statements made on information or belief are believed to be true; and further that these statements are made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that any such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Date: 8/2/2004

Natarajan S. Ramesh

Dr. Natarajan S. Ramesh

Attachment A: Experimental Data on Heat Lamination

For all of the following examples, the lamination was performed via the method described in the application as originally filed, page 11, lines 13 through 30.

Example #1

A 2-mil thick HDPE blown film was used, having a 1^{st} heat peak melting point of 258.82 °F as measured with a Perkin-Elmer differential scanning calorimetry instrument. The temperature of the HDPE film before lamination was 73 °F, which was determined by using a Model 3MC13 Raytek Raynger ST infrared thermometer. The lamination process began by bringing the 2 mil HDPE film in contact with a hot roller and then bringing the film in contact with a 2 pcf, 75 mil thick LDPE foam at the nip point. The HDPE film was in contact with the hot roller for a distance of 60% of the hot roller circumference.

The line speed was held at 85 feet per minute. The residence time in seconds was calculated by using the following formula:

$$\text{Residence time (seconds)} = \frac{\pi \cdot (D/12) \cdot 0.6}{L} \cdot 60$$

where "D" is the diameter of the hot roller (8 inches) and "L" is the line speed in feet per minute.

The lamination temperature was determined using a Raytek Raynger ST infrared thermometer by aiming a beam at the heated film just before the nip point where the lamination occurred. A sample of the laminated material was saved and the quality of lamination was observed.

The width of the film was measured in inches and the % shrinkage of the film was calculated using the original and final width of the film.

The above procedure was repeated for samples at the various hot roller temperatures shown below to establish experimental data showing lamination and process conditions such as lamination temperature, line speed, residence time, wrinkling of film and percentage of shrinkage. The data from these experiments are shown in below:

Sample	Initial Film Temp Before Lamination (°F)	Hot Roller Temp (°F)	Line Speed (ft/min)	Residence Time (sec)	Lamination Temp (°F)	Lamination Quality	Film Width (in)	% Shrinkage
A	73.0	300	85	0.89	218	Delamination	64.750	0.385
B	73.1	340	85	0.89	244	Good	64.250	1.154
C	73.1	375	85	0.89	255	Excellent	64.000	1.538
D	73.1	380	85	0.89	259	Excellent	64.000	1.538
E	73.1	420	85	0.89	293	Wrinkling and shrinkage	63.000	3.077
F	73.1	470	85	0.89	332	Heavy wrinkling and shrinkage	62.500	3.846

Example #2

A 0.65-mil thick BOPP (biaxially oriented polypropylene) film was used, having a 1st heat peak melting point of 323.71 °F as measured by a Perkin-Elmer differential scanning calorimetry instrument. The upper limit of the film's heat set/orientation temperature is about 320 °F. The temperature of the BOPP film before lamination was 82°F, which was determined by using a Model 3MC13 Raytek Raynger ST infrared thermometer. The lamination process began by bringing the 0.65 mil BOPP film in contact with a hot roller and then bringing the film in contact with a 2 pcf, 75 mil thick LDPE foam at the nip point. The HDPE film was in contact with the hot roller for a distance of 60% of the hot roller circumference.

The line speed was held at 85 feet per minute. The residence time in seconds was calculated by using the following formulation:

$$\text{Residence time (seconds)} = \frac{\pi \cdot (D/12) \cdot 0.6}{L} \cdot 60$$

where "D" is the diameter of the hot roller (8 inches) and "L" is the line speed in feet per minute.

The lamination temperature was determined by using a Raytek Raynger ST infrared thermometer by aiming a beam at the heated film just before the nip point where the lamination occurred. A sample of the laminated material was saved and the quality of lamination was observed.

The width of the film was measured in inches and the % shrinkage of the film was calculated using the original and final width of the film.

The above procedure was repeated for samples at various hot roller temperatures shown below to establish experimental data showing lamination and process conditions such as lamination temperature, line speed, residence time, wrinkling of film and percentage of shrinkage. The data from this experiment is shown below:

Sample	Initial Film Temp Before Lamination (°F)	Hot Roller Temp (°F)	Line Speed (ft/min)	Residence Time (sec)	Lamination Temp (°F)	Lamination Quality	Film Width (in)	% Shrinkage
A	82.7	300	85	0.89	246	Delamination	48.250	0.515
B	82.7	350	85	0.89	282	Excellent	46.500	4.124
C	82.7	380	85	0.89	309	Some film shrinkage	39.750	18.041
D	82.7	400	85	0.89	341	Wrinkling and film tearing	-	-

The above data shows that at a lamination temperature around 282 °F, the film laminates well. This is below the typical orientation temperature upper limit of 293 °F reported in earlier studies (US 3,331,679).

Example #3

A 0.9-mil thick oriented HDPE film was used, having a 1st heat peak melting point of 265.69 °F as measured with a Perkin-Elmer differential scanning calorimetry instrument. The temperature of the HDPE film before lamination was 91°F, which was determined by using a Model 3MC13 Raytek Raynger ST infrared thermometer. The lamination process began by bringing the 0.9 mil HDPE film in contact with a hot roller and then bringing the film in contact with a 2 pcf, 75 mil thick LDPE foam at the nip point. The HDPE film was in contact with the hot roller for a distance of 60% of the hot roller circumference.

The line speed was held at 85 feet per minute. The residence time in seconds was calculated by using the following formulation:

$$\text{Residence time (seconds)} = \frac{\pi \cdot (D/12) \cdot 0.6}{L} \cdot 60$$

where "D" is the diameter of the hot roller (8 inches) and "L" is the line speed in feet per minute.

The lamination temperature was determined by using a Raytek Raynger ST infrared thermometer by aiming a beam at the heated film just before the nip point where the lamination occurred. A sample of the laminated material was saved and the quality of lamination was observed.

The width of the film was measured in inches and the % shrinkage of the film was calculated using the original and final width of the film.

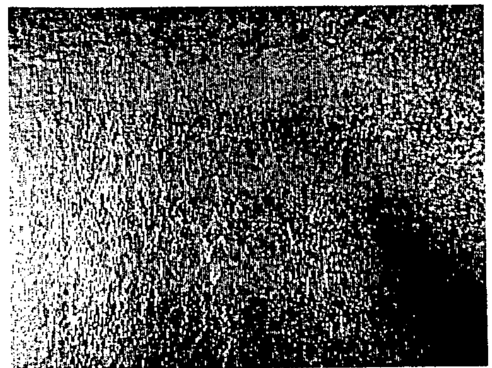
The above procedure was repeated for samples at various hot roller temperatures shown below to establish experimental data showing lamination and process conditions such as lamination temperature, line speed, residence time, wrinkling of film and percentage of shrinkage. The data from this experiment is shown below:

Sample	Initial Film Temp Before Lamination (°F)	Hot Roller Temp (°F)	Line Speed (ft/min)	Residence Time (sec)	Lamination Temp (°F)	Lamination Quality	Film Width (in)	% Shrinkage
A	91.2	230	85	0.89	208	Delamination	51.000	1.923
B	91.2	275	85	0.89	224	Excellent	49.250	5.288
C	91.2	300	85	0.89	238	Excellent	48.500	6.731
D	91.2	320	85	0.89	251	Some film shrinkage	46.875	9.856
E	91.2	350	85	0.89	283	Wrinkling and film tearing	-	-

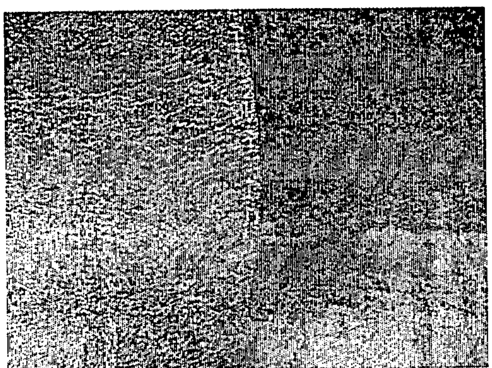
The above data shows that a lamination temperature window of about 224 to about 238 °F exists in which good or excellent lamination can be achieved. This is below the orientation temperature upper limit of 266 °F reported in earlier studies (US 3,331,679).

Photographs of the resulting laminated samples are shown below.

Sample A: 246°F lamination temp



Sample B: 282°F lamination temp

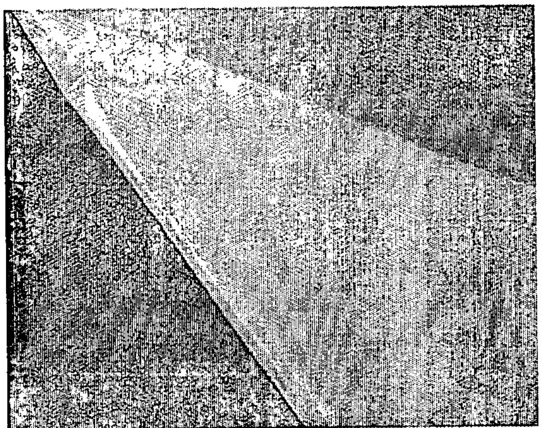


Sample C: 309°F lamination temp

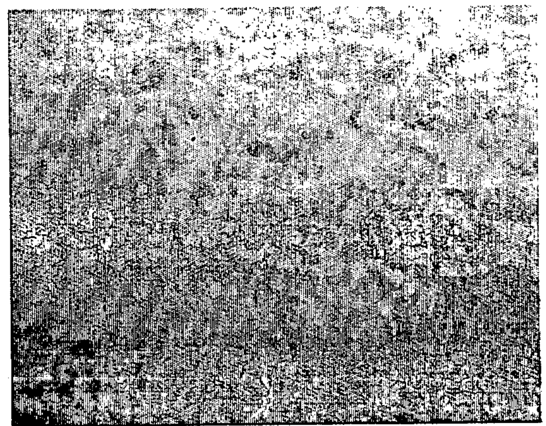
Sample D: 341°F lamination temp

The above data shows that a lamination temperature window of about 244 to about 259 °F exists in which good or excellent lamination can be achieved.

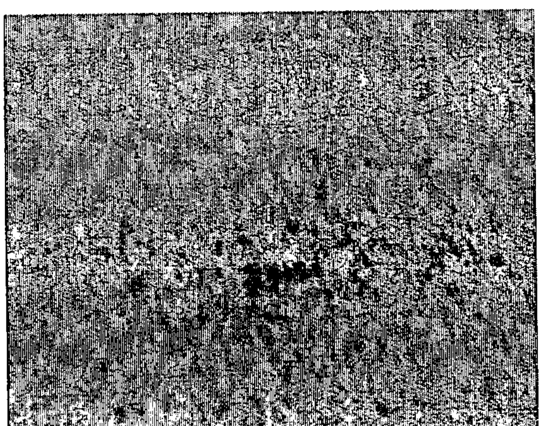
Photographs of the resulting laminated samples are shown below.



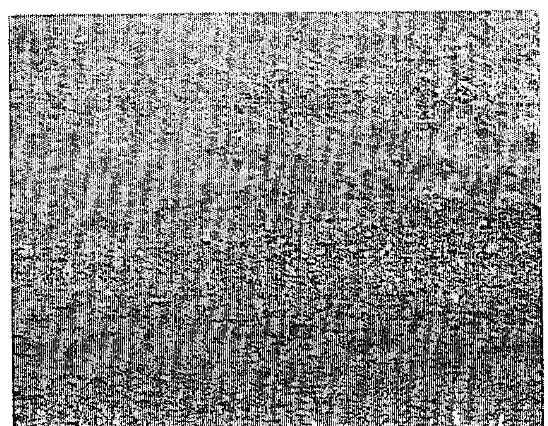
Sample A: 218°F lamination temp



Sample B: 244°F lamination temp

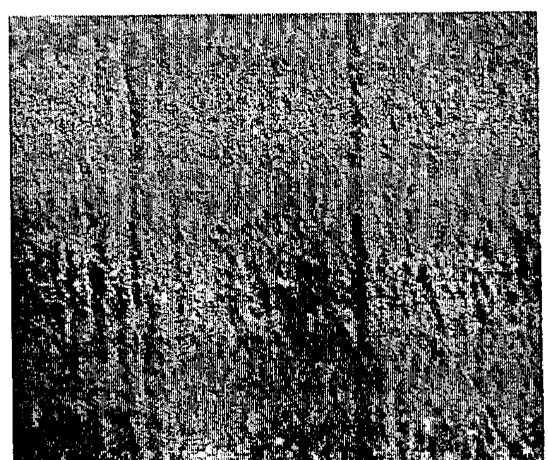


Sample C: 255°F lamination temp



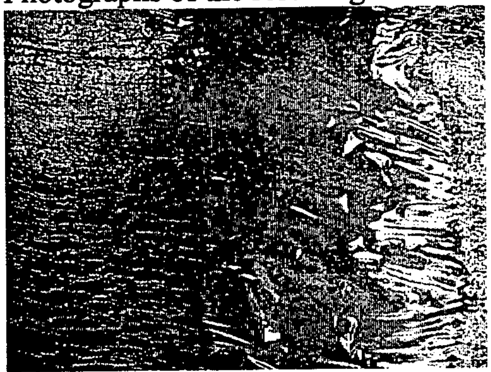
Sample D: 259°F lamination temp

Sample E: 293°F lamination temp

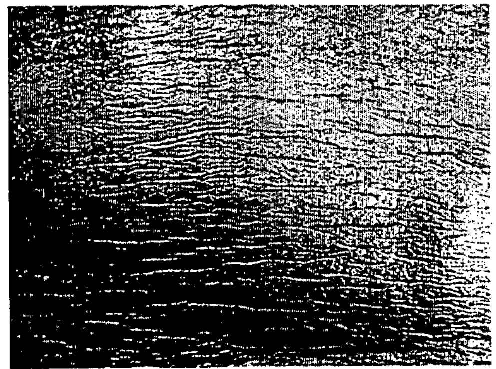


Sample F: 332°F lamination temp

Photographs of the resulting laminated samples are shown below:

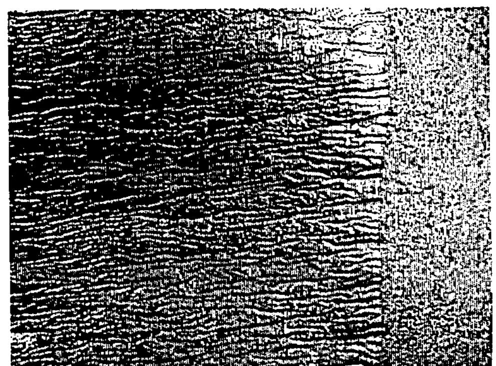


Sample A: 208°F lamination temp

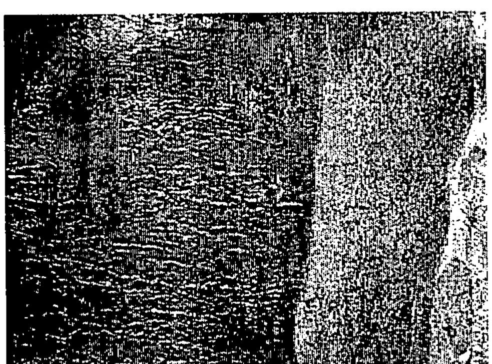


Sample B: 224°F lamination temp

Sample C: 238°F lamination temp



Sample D: 251°F lamination temp



Sample E: 283°F lamination temp